ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
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	)	
Amendment of the Commission's	)	GEN Docket No. 90-314
Rules to Establish New Personal	)	PP-73
Communications Services	)	

PETITION FOR RECONSIDERATION OF SPATIAL COMMUNICATIONS, INC.

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SUMMARY

In this petition for reconsideration, Spatial Communications, Inc. (SCI) seeks review and reversal of the Commission's decision denying SCI a pioneer's preference for the truly innovative Spatial Division Multiple Access (SDMA) technology. SCI has demonstrated the technical feasibility and innovative nature of SDMA technology which relies upon patented algorithms to implement *smart antennas* that track mobile users and selectively direct RF energy toward the intended receivers. The technical feasibility and public benefits of SDMA technology have been confirmed by independent technical experts and by such diverse entities as the National Science Foundation and the Advanced Research Projects Agency.

In addition to computer simulations of SDMA technology, SCI has undertaken field tests under actual operating conditions using prototype equipment and software developed by ArrayComm, its parent company. The experimental test results were filed with the Commission in September 1993, but were not apparently considered in the Commission's preference determination. At a minimum, this omission requires reconsideration of the decision in denying SCI's preference request.

SDMA technology -- which is based on nearly twenty year's work by the lead innovator, Dr. Richard Roy -- offers

substantial public interest benefits. Among other things, SDMA is highly spectrum efficient, increasing the number of channels that can be served within the allocated bandwidth. SDMA technology lowers the overall system development cost, and ultimately the subscriber cost. In addition, SDMA provides a system-wide improvement in the communication signal quality through reductions in the overall system noise/interference level. Other benefits include reduced transmitter power, which mitigates any concerns about RF-related health risks, and enhanced emergency 911 services through SDMA's inherent position-location feature.

Award of a pioneer's preference to SCI is fully consistent with the Commission's objectives underlying adoption of a preference. Indeed, SCI and its principals, including Martin Cooper who was instrumental in developing the current U.S. cellular system, are the very type of pioneering individuals that the preference was designed to encourage and reward.

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PETITION FOR RECONSIDERATION OF
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Spatial Communications, Inc. (SCI), by its attorneys, seeks review and reversal of the Commission's decision, denying a pioneer's preference to SCI for its innovative Spatial Division bMultiple Access (SDMA) technology.[1/] Not only has the Commission overlooked the pioneering role of SCI in developing SDMA -- a dramatic new PCS technology -- but it failed to consider detailed evidence, on file with the Commission, which conclusively demonstrates the technical feasibility of this technology. In light of these unique and compelling circumstances, the Commission should reconsider its previous decision and award a pioneer's preference to SCI for the Los Angeles, Long Beach and/or Seattle markets.

1/ Third Report and Order, GEN Docket No. 90-314, 93-550, released February 3, 1994 (hereinafter cited as "Third Report and Order.")

I.
INTRODUCTION AND SUMMARY

In its May 4, 1992 Request for Pioneer's Preference, SCI sought a preference for its innovative work in inventing, testing and developing SDMA technology. SDMA --- which uses *smart antennas* to track mobile users and selectively direct RF energy toward the intended receivers --- holds great promise for providing substantial public benefits, including increased spectrum efficiency and reduced RF interference. Demonstrating the technical feasibility of this innovative and publicly beneficial technology, SCI has submitted detailed technical information about SDMA, including computer simulations and experimental test results.

The commercial applicability and technical feasibility of SDMA for PCS use has been widely confirmed by independent technical experts (see affidavits attached hereto as Exhibit A).[2/] Diverse government entities have also recognized the enormous commercial and technical potential of SDMA technology, including the National Science Foundation and the Advanced Research Projects Agency (ARPA), both of which have awarded monetary grants for further developmental work.

2/ SCI is submitting herewith, as Exhibit A, affidavits from recognized technical experts attesting to the technical feasibility of SDMA technology, based on their review of the relevant literature and first-hand observations.

Substantial efforts by SCI's marketing team, headed by its CEO Martin Cooper, have led to a significant amount of interest in SDMA technology specifically with respec to its benefits in increasing the cost-effectiveness of proposed PCS systems.

Despite this widespread support and acknowledgement for SDMA technology, the Commission summarily denied SCI's preference request, in the Third Report and Order, on the grounds that SCI "did not respond to the Tentative Decision" with supplemental information demonstrating its technical feasibility and innovation.[3/] To the contrary, SCI has provided detailed information, which conclusively establishes its pioneering working in developing the innovative SDMA technology.[4/] In addition to its initial preference in May and June, 1992 submissions, ArrayComm, SCI's parent company, undertook an extensive experimental program during the 1992-93 period. The experimental test results were reported in a supplemental September 13, 1993 filing with the Commission.[5/]

3/ Id. at para. 277.

4/ A copy of SCI's May 4, 1992 Request for Pioneer's Preference and the associated Technical Appendix is attached hereto as Exhibit B. Attached as Exhibit C is a copy of additional technical information provided to FCC Staff in June 1992.

5/ A copy of the Experimental Test Results is attached hereto as Exhibit D. This supplemental information is hereby formally submitted for association with SCI's preference request that the test results are properly filed and considered. SCI requests that the Commission take whatever actions may be necessary, pursuant to Commission Rules 1.1 and 1.4 to ensure that the test results are properly filed and considered.

These previously-filed materials abundantly demonstrate SCI's compliance with all pioneer's preference criteria.

SDMA Technology is Technically Feasible. SCI has provided detailed information demonstrating the technical feasibility of SDMA technology, including extensive computer simulations and experimental test results. It has developed and tested prototype SDMA equipment -- including proprietary software and signal processing equipment -- in a field environment. Further demonstrating technical feasibility, independent technical experts have provided affidavits attesting to the technical feasibility of SDMA, based on review of the relevant literature and first-hand observations. The awards from the National Science Foundation and ARPA corroborate SCI's claims.

SDMA is Truly Innovative. SDMA technology uses unique, proprietary and patented technology. In addition to developing revolutionary signal processing techniques, SDMA has been specifically adapted to improve PCS through the tracking and signal direction identification of mobile transmitters and receivers. SCI's pioneering work invovles development of the core algorithms and incorporation of those proprietary a;gprotj,s om PCI system architectures

At the core of the technology is the ability to estimate, accurately and efficiently, signal parameters from measurements made with an array of sensors. SDMA thus uses smart antennas to

focus or concentrate transmitted power toward the mobile unit on the downlink and directionally receive transmissions from the mobile unit on the uplink. The net effect is a significant increase in receiver sensitivity, a more effective use of transmitted power from the base station, a substantial increase in spectral efficiency (capacity), and, ultimately, reduced system infrastructure cost per subscriber. Through the extensive industry contacts of Mr. Cooper, most major U.S. operators of U.S. systems that plan on policymaking in PCS have been made aware and have confirmed the significant potential of SDMA technology.

SCI and its Principals Have Developed the Innovative SDMA Technology. Dr. Richard Roy, SCI's President and Chief Scientist, is the lead innovator of SDMA technology. He has spent nearly twenty years developing this pioneering smart antenna technology. As more fully detailed below, Dr. Roy developed the core algorithms for high-speed direction finding, which underlie SDMA technology, as a doctoral candidate at Stanford University in the late 1970s and throughout the 1980s. Over the past five years, the concept has been subsequently refined and verified by Dr. Roy and others on his development team, incorporated in prototype software and hardware configurations, and tested in field conditions. ArrayComm, SCI's

parent company, has taken the lead in efforts to commercialize SDMA technology.[6/]

In short, SCI should be awarded a preference for its pioneering work in developing the dramatic new SDMA technology, which promises significant public interest benefits in the PCS environment, and its significant efforts to bring this new technology to the PCS marketplace. The Commission should reconsider and reverse its earlier decision to the contrary. At a minimum, the Commission should consider the supplemental experimental test results submitted on September 13, 1993, after release of the Tentative Decision. This report contains additional information documenting the technical feasibility of SDMA technology and the major contributions of SCI and its principals in developing SDMA. These results, submitted by Dr. Roy on September 13, 1993, are directly relevant to the issue of technical feasibility and, along with other evidence of technical feasibility, must be evaluated by the Commission before ruling on SCI's request.

6/ ArrayComm, SCI's parent company, is now moving forward with efforts to commercialize SDMA technology, in conjunction with Watkins-Johnson Co., a leader in the field of high-quality defense electronics, and Spectarian, a major supplier of commercial transmission systems to wireless communications operators.

II.
SDMA IS A TRULY INNOVATIVE PCS TECHNOLOGY

A. Brief Description Of SDMA Technology

Spatial Division Multiple Access (SDMA) is a truly innovative wireless access technology that offers dramatic benefits in PCS spectrum efficiency. A complete technical description of SDMA is included in SCI's previous filings with the Commission, copies of which are attached hereto (as Exhibits B, C and D technology is provided below.

In simplified terms, SDMA involves application of high-impact, revolutionary new signal processing concepts to wireless communication systems. SDMA involves dynamic, real-time utilization of the spatial dimension in the frequency assignment process of wireless mobile communications systems. Through use of *smart antennas*, SDMA separates signals based on location. By using more than one receiving antenna (i.e. an array of simple antennas) and spatially sampling the electromagnetic fields, it is possible to estimate the directions-of-arrival of multiple co-channel signals and to separate the underlying source waveforms. As a result, users are tracked and RF energy selectively received from and directed toward intended receivers.

Incorporation of SDMA technology in a PCS system allows multiple portable/mobile transceivers to occupy the same frequency, time slot or code simultaneously, and allows

substantial reductions in transmitted power from both the base stations and the portable units. As a result, use of SDMA technology achieves more efficient usage of available spectrum.[7/]

B. Contributions Of SCI And Its Principals

A technology is deemed innovative, within the meaning of the pioneer's preference rules, where the applicant "brought out the capabilities or possibilities of the technology or service or brought them to a more advanced or effective state."[8/] SCI and its principals have been directly, and exclusively, involved in development of the innovative SDMA technology and have therefore satisfied the applicable preference requirements in this regard.

SDMA technology essentially represents the life's work of a pioneering individual - Dr. Richard Roy. Dr. Roy developed the core algorithms underlying SDMA technology in the early 1970s and throughout the 1980s as a Ph.D. candidate at Stanford University. He has received two patents on the basis of his work.[9/] Subsequently, he has devoted nearly 20 years of his life to

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7/ Detailed information about SDMA is provided in SCI's preference request and the associated Technical Appendix. See Exhibit B.

8/ 6 FCC Rcd 3488, 3494.

9/ Copies of these patents are attached as Exhibit E. These patents are entitled "Methods and Arrangements for Signal Reception and Parameter Estimation," and "Method for Estimating Signal Source Locations and Signal Parameters Using An Array of Signal Sensor Pairs." An additional patent application has been filed and is now pending.

refining and developing the SDMA concept for commercial application: through his consulting firm, Systems Research Associates; as President and Chief Scientist of SCI; and as President and Chief Technical Officer of ArrayComm, SCI's parent company. In these capacities, Dr. Roy has supervised an ambitious program of experimentation, software and hardware development, and system design directed towards application of SDMA in a PCS environment.[10/]

As noted elsewhere in this filing, SCI/ArrayComm is now moving forward with commercialization of SDMA technology in conjunction with Watkins-Johnson and Spectarian. Largely through the efforts of Martin Cooper, CEO of SCI and ArrayComm, and SCI's technical team, information about SDMA technology has been widely disseminated, in the U.S. and worldwide, and is generating a substantial amount of interest in the user community.

C. Specific Innovations

The innovative nature of SDMA technology has been recognized by a wide variety of private companies and government entities. In the PCS proceeding, several companies commented favorably with respect to SCI's preference request and confirmed the innovative

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10/ A corporate resume for SCI is associated with the May 1992 preference request (Exhibit B). A corporate resume for ArrayComm, and biographical information for Dr. Roy and other key members of the SDMA development team, are attached as Exhibit F.

nature of SDMA technology. PacTel, for example, called SDMA "a technically elegant and intriguing system that shows great promise."[11/]

In addition, SCI's pioneering work in SDMA technology has been recognized by such diverse government agencies as the National Science Foundation and the Advanced Research Projects Agency (ARPA). The National Science Foundation awarded a Small Business Innovative Research (SBIR) grant in 1992 to Dr. Roy to continue his developmental work with SDMA. ARPA recently advised Dr. Roy that his proposal for "Spatial Division Multiple Access Wireless Communication Systems," has been selected for a $11.4 million Technology Reinvestment Project (TRP) grant.[12/] The specific technological innovations and contributions of SCI and its principals, include the development of core algorithms and the incorporation of these patented algorithms in PCS hardware design and system architecture. Not only has SCI, and its principals developed the basic signal processing techniques,

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11/ Comments of Pacific Telesis Group, GEN Docket No. 90-314, filed June 10, 1992 at 11. Pacific Telesis recommended that SCI be "considered for a preference in the event that its 'dramatic new technology' proves feasible."

12/ A final report prepared by Dr. Roy in connection with the SBIR study, "Increasing Capacity in Wireless Information Networks," is attached hereto as Exhibit G. The TRP proposal (No. ARPA-TRP-93-29P) contains proprietary information, and is therefore not submitted here. The proposed effort centers on the development of a prototype SDMA system for the DCS-1800 PCS standard.

underlying SDMA, but they have adapted those techniques to a PCS environment and developed prototype software and hardware.

1. Development of Core Algorithms

The basic algorithms for high-speed direction finding were developed by Dr. Richard Roy as a doctoral thesis at Stanford University, beginning in 1975. He received a patent in 1988 for the core algorithms. These algorithms, known as ESPRIT (Estimation of Signal Parameters via Rotational Invariance Techniques), enable an assessment of the RF environment in order to identify locations of RF energy sources. The algorithms provide the theoretical basis for SDMA technology, and allow tracking of PCS transceivers, in order to detect and estimate the location of multiple signals on the same frequency.

These core algorithms, as discussed below, have been incorporated by SCI in prototype software and hardware configurations. In other words, development of the basic SDMA algorithms was a critical first step. In order to provide SDMA, these algorithms must be incorporated into the PCS system design. The algorithms process the input to an array of receivers and effectively isolate signals using estimations based on the spatial dimension of the signal. If you configure an antenna array in the prescribed way and process data according to the specified algorithms (e.g. mathematical formulae), then the benefits of SDMA technology accrue.

2. Incorporation of Proprietary Algorithms in Hardware Design and System Architecture

The components of the SDMA system include: (1) antenna arrays and RF frontends; (2) proprietary SDMA signal processing algorithms; (3) Digital Signal Processing (DSP) hardware to implement the algorithms in real-time; and (4) interface equipment to existing base stations.

SCI/ArrayComm has developed prototype SDMA equipment, including interface equipment, in order to provide a working demonstration of a full-duplex SDMA system. SCI has combined a less complex version of the military phased-array antenna technology (used successfully in military applications over the last 40 years) with the proprietary signal processing techniques developed by principals of SCI.

The SDMA algorithms have been incorporated in system hardware design and system architecture. The SDMA algorithms are embodied in proprietary software which is implemented in a proprietary hardware design using digital processing and analog RF components. SCI has developed this proprietary software over a five year period of time, beginning in 1989. This proprietary software has been incorporated in the prototype equipment that has been and is now being used for ongoing experiments.

Based on the results of these experiments, the next-generation hardware and software is now being designed and built for PCS implementation by ArrayComm, SCI's parent company.

The second-generation SDMA processor under development will apply to all proposed PCS air-interface standards, both analog and digital. The antennas and base stations incorporate the SDMA technology. The algorithms and hardware configuration could be incorporated by any manufacturer, regardless of RF modulation format, desiring to utilize this break-through technology.

It bears emphasis that, while other companies may be considering development of high-gain fixed sector antennas, SCI/ArrayComm were the first to develop the intelligent array concept and is currently the only company working on that concept. SDMA incorporates a tracking feature, which fixed sector antennas lack, that permits SDMA's flexible, intelligent and publicly beneficial allocation of spectral resources.

III.
SDMA PROVIDES SIGNIFICANT PUBLIC INTEREST BENEFITS IN A PCS ENVIRONMENT

Underlying the pioneer's preference is a desire "to encourage innovators including individuals, small businesses and large corporations, to develop new spectrum-using services and technologies." 13/ Technologies deserving careful consideration

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13/ Report and Order in GEN Docket No. 90-217, 6 FCC Rcd 3488 (1991). In adopting the pioneer's preference, the Commission intended: (1) to encourage present and future innovators in communications to submit proposals to the Commission that otherwise would not have been submitted; (2) to decrease regulatory uncertainty for the innovator;

Footnote continued on next page.

for pioneer's preference are those "that yield efficiencies in spectrum use, speed or quality of information transfer, or spectrum sharing, or which significantly reduce cost to the public."[14/]

Grant of a preference to SCI, for SDMA technology, would be fully consistent with the Commission's goals in adopting the pioneer's preference rules. Not only is SDMA innovative from a technical standpoint, it provides significant public interest benefits in a PCS environment, including increased spectrum efficiency, improved quality of information transfer and lower cost of service to the public. SDMA is potentially applicable to all RF modulation formats, both analog and digital. It therefore holds great promise for increased spectrum efficiency, improved service quality, and greater system flexibility for all PCS operators.

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and (3) to encourage investors to provide financial support for innovators in communications. Memorandum Opinion and Order in GEN Docket No. 90-217, 7 FCC Rcd 1808 (1992).

14/ 6 FCC Rcd at 3494. The Commission further refined its standards for granting pioneer's preference in its *Tentative Decision* 7 FCC Rcd at 5734, 35 when it listed the following factors as relevant to the decision of whether a pioneer's preference would be granted: (1) added functionality; (2) new use of spectrum; (3) changed operating or technical characteristics; (4) increased spectrum efficiency; (5) increased speed or quality of information transfer; (6) technical feasibility: and (7) reduced cost to the public. SDMA technology will, in fact, offer all of these public interest benefits.

Use of SDMA technology significantly increases the number of channels that a base station can serve without allocation of more frequency channels.[15/] This is achieved in two ways. First, SDMA techniques reduce the required amount of transmitted power from both the base stations and the mobile units, thereby greatly reducing RF pollution and interference. SDMA's innovative signal processing approach overcomes multiple signal reception problems. Secondly, since multiple users are allowed to occupy the same frequency, time slot or code at the same time, spectral efficiency is greatly enhanced.

Use of SDMA technology lowers the overall system deployment cost by reducing the number of base stations required to handle a given system load. By properly exploiting the spatial dimension, SDMA technology increases system efficiency and capacity, and ultimately reduces the system infrastructure cost per subscriber. This translates into reduced costs to the public. Recent cost savings for a nationwide DCS-1800 system in Germany, for example, are approximately 35% over conventional systems. A conventional DCS-1800 base station plus BSC link is approximately 2.4 times more expensive than a SDMA base station plus BSC link.[16/]

15/ By way of illustrating, the results indicate that a factor of four capacity increase per cell is achievable by deploying SDMA base stations with eight-element arrays.

16/ A table illustrating the potential cost savings is attached hereto as Exhibit H.

Another benefit to be gained from SDMA is a system-wide improvement in the communication signal quality. By reducing the overall system noise/interference level, the capacity of each communications link is increased. The quality improvement results from a system-wide RF noise level reduction. Reduced transmitter power results in a reduction of the background radio frequency energy level -- interference or RF pollution. Reductions in system-wide interference levels allow operators to increase capacity through more frequent spatial reuse of channels.

Reduced interference levels mean that mobile handsets can operate with reduced transmitter power; handsets can therefore be made lighter and smaller with extended battery lifetimes at reduced cost. The ability to operate at reduced RF power levels also mitigates any concerns about RF-related health risks.

Other companies have acknowledged the public interest benefits offered by SDMA technology. In the petitions for reconsideration of the Commission's Second Report and Order in GEN Docket No. 90-314,[17/] filed December 8, 1993, there is broad support for raising the maximum permitted power for PCS base stations to accommodate innovative new technologies such as "smart antennas." In this regard, Telocator noted, in its petition for reconsideration, that "smart antennas" -- such as

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17/ Second Report and Order, Gen Docket No. 90-314, FCC 93-451, released October 22, 1993.

proposed by SCI/ArrayComm -- "can make a significant contribution towards the Commission's goal of wide area availability," and, in addition, extend base station transmitter range, reduce co-channel interference to other PCS operators or microwave receivers.[18/]

In sum, SDMA technology offers operators the ability to significantly improve service quality and simultaneously increase user capacity, while reducing the cost of service to the public.

IV.
SDMA IS TECHNICALLY FEASIBLE

SCI has submitted detailed evidence of SDMA's technical feasibility, in its May 4, 1992 Request for Preference and September 13, 1993 Experimental Results. Additional information about SDMA technology, and its technical feasibility, was provided in meetings with various FCC staff on June 9, 1992.[19/] These submissions conclusively demonstrate the technical feasibility of SDMA technology, through theoretical analysis, computer simulations and actual field testing using prototype equipment. Moreover, the feasibility and commercial potential of SDMA technology has been recognized by such technology

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18/ Telocator Petition for Reconsideration in GEN Docket No. 90-314, filed December 8, 1993, at 3-4. See also MCI Petition for Partial Reconsideration and Clarification, filed December 8, 1993 at 6-10, recommending modification of the proposed technical rules to accommodate the use of new technologies, including smart antennas.

19/ See Exhibit C hereto.

authorities as the National Science Foundation and ARPA. Indeed, no party has offered any evidence refuting SCI's showings of technical feasibility.[20/]

Further confirming the technical feasibility of SDMA, SCI has attached hereto, as Exhibit A, a number of affidavits from technical experts in the PCS field. These experts provided their opinion that "SDMA technology is technically feasible and represents a truly innovative approach to increasing spectral efficiency," based on review of the relevant literature and first-hand observations. The affidavits further attest that:

> Deployment of SDMA technology will substantially reduce the amount of radiated (RF) power (over current technologies) required, per link, to establish reliable communication through directional transmission from and directional transmission by base stations, and will allow multiple wireless links to share the same spectrum in the same cell.

The attached affidavits verify the benefits of SDMA technology, which include lower power handsets and base station RF transmissions.[21/]

20/ There were no serious criticisms of SCI's SDMA technology in the public comments submitted on June 10, 1992, and several parties commented favorably on SDMA's potential. SDMA's technical feasibility in an actual operating environment was fully demonstrated by the experimental testing subsequently undertaken by SCI, and therefore mooted the comments of GTE and PacTel in that regard.

21/ The affidavits were prepared by Dennis Rucker, Director of Engineering, and George Geotsalitis, Manager of PCS Standard, of U.S. Cellular Corp.; Stuart Jeffrey, Vice President of Kycom; Guy Jouannelle, Senior Engineer of LCCLLC. See also Engineering Statement and Declaration of

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In SCI's Technical Appendix, appended to its May 4, 1992 preference request, SCI presented the results of computer simulations indicating the ability of SDMA technology to increase PCS capacity and quality.[22/] The Appendix also provided preliminary experimental results, including tests run in a controlled RF environment (anechoic chamber).[23/] These experiments demonstrated the ability of SDMA to localize three co-channel sources in close proximity with varying power levels.

The Technical Appendix outlined a two-year experimental plan, culminating in final system certification and mass production and installation of SDMA technology base stations in fully operational PCNs. Pursuant to that plan, further testing of SDMA technology was undertaken between May 1992 - August 1993. The results of this testing were detailed in a September 13, 1993 filing with the Commission.[24/]

As more fully described therein, the experimental program used SDMA prototype equipment, developed by ArrayComm, SCI's parent company. The results of initial SDMA experimentation verified an improvement in signal quality approximately equal to

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Robert A. Voss, appended to December 8, 1993 Petition for Partial Reconsideration of MCI, which comments favorably on SCI's smart antenna technology.

22/ SCI Request for Pioneer's Preference, Appendix A at 27-31.

23/ Id. at 31-38.

24/ See Exhibit D.

the theoretical gain. Additional experiments demonstrated SDMA's ability to spatially demultiplex and improve multiple waveforms, and to directively transmit to specific users. These experiments demonstrated that, through use of SDMA technology, substantial increases in spectral efficiency can be achieved - through power reductions in base station transmit power levels and increases in coverage area. A videotape was also submitted which included footage of the experiments being conducted.[25/]

These submissions clearly demonstrate SDMA's technical feasibility. While the September 1993 test results support SCI's claims, it bears emphasis that, even without the field testing SCI's showing of technical feasibility complied fully with the FCC's rules. The Commission has never required a showing of technical feasibility in "an actual operating environment." Even though operation under actual field conditions is not required, SCI has, in fact, successfully tested prototype SDMA equipment under such conditions.

IV.
THE COMMISSION'S PREFERENCE DECISION WAS IMPROPERLY BASED ON AN INCOMPLETE RECORD

The Commission's decision, denying SCI's preference request, was improperly based on an incomplete record and is therefore fatally defective. Under well-established Commission precedent,

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25/ The experimental results and videotape were submitted under File No. S-1193-EX-93 (Call Sign KS2XAG).

the Commission should re-open the record, if and as necessary, to consider material information that was timely filed with the Commission, but not associated with SCI's pioneer's preference.

In denying SCI's preference request, the Commission lacked a critical piece of information: the experimental test results submitted in September 1993 by Dr. Roy. Although these results further demonstrated the feasibility of SDMA technology, this key information was not considered by the Commission in evaluating SCI's preference request.[26/]

As discussed above, the experimental program discussed in the September 1993 test results involved prototype SDMA equipment operating under actual field conditions. This testing further confirmed the technical feasibility of SDMA technology and was therefore directly relevant to the Commission's pioneer's preference determination. The failure to consider the experimental test results was highly prejudicial to SCI's rights, and requires reconsideration of the Commission's decision.[27/]

26/ The Commission has allowed applicants to supplement their preference claims after release of a Tentative Decision. See, e.g., First Report and Order, July 23, 1993, GEN Docket 90-314, 8 FCC Rcd 7162, 7174. The Commission there allowed Mtel to submit supplementary experimental data demonstrating the feasibility of its technology.

27/ See Iowa Radio Service, Inc., 61 RR 2d 292, 296 (1986). The failure of an Administrative Law Judge, in that case, to consider a pleading which was timely filed but not properly associated with the case file required reversal of the ALJ's decision granting an additional two-way channel to a DPLMRS licensee. The accuracy of the applicant's traffic loading

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